

Release of Seasonal Adult Mosquito Abundance Datasets

1999 through 2020

Prince George's &
Anne Arundel Counties
Maryland, United States



**Mr. Stephen P. Panossian, VMCA Associate
Contractual Agricultural Inspector II
Maryland Department of Agriculture
Mosquito Control Section
College Park Field Office
VMCA Annual Conference
Virtual Presentation: January 26, 2022**



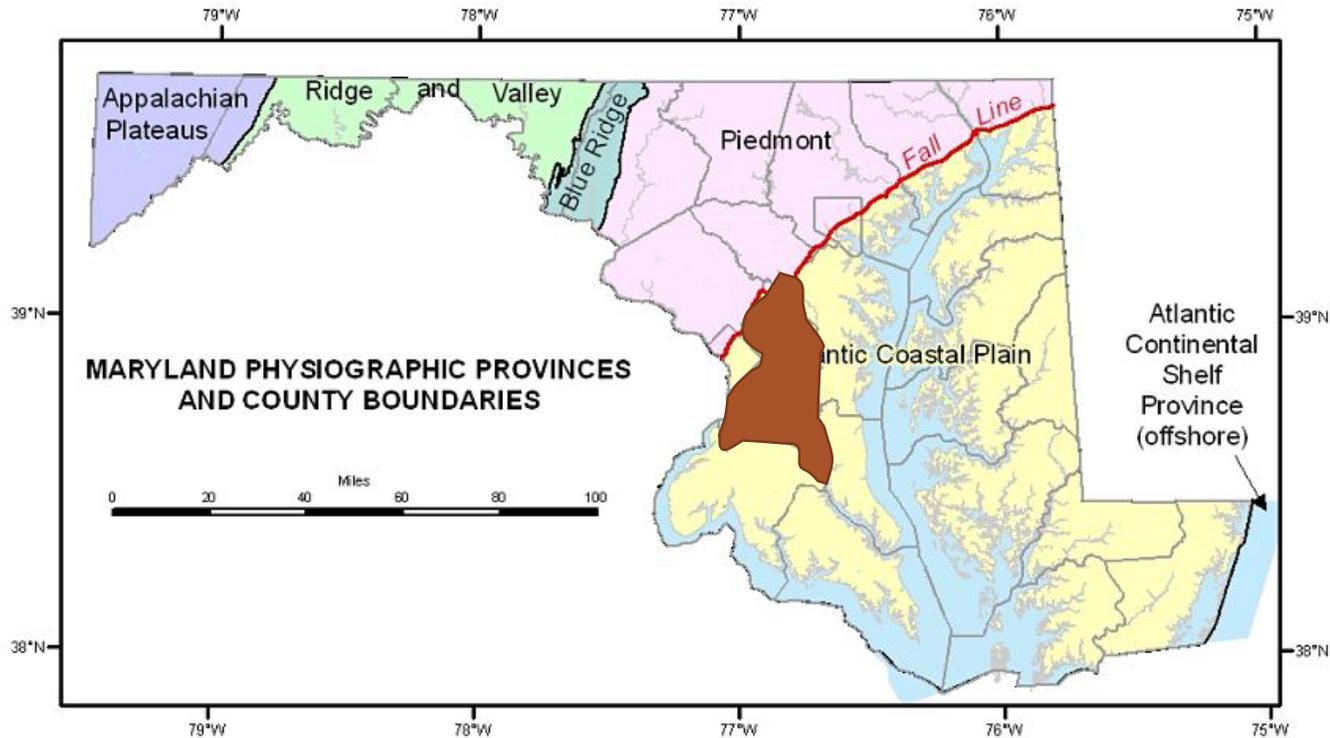
Disclaimer

- I am a **seasonal contractor** (not an employee) to the Maryland Department of Agriculture (MDA) in its Mosquito Control Section (since 2013)
- Any opinion I express is my own and **not on behalf of MDA**
- Any product displayed or mentioned during this presentation **neither asserts nor implies an endorsement by MDA**
- I have no medical credentials—any discussions of cases of positive arboviruses (such as West Nile Virus) refer only to mosquito pools and not human cases
- **MDA neither accesses nor records human patient data** in cases of human arbovirus infections

MOSQUITO ABUNDANCE DATASETS

- 1999 through 2020 = 23 historical datasets
- About 3 Mb total
- Prince George's (primarily) and Anne Arundel Counties
- Coordinates included
- Available at [VectorBase.org](https://vectorbase.org)

Maryland's Geography



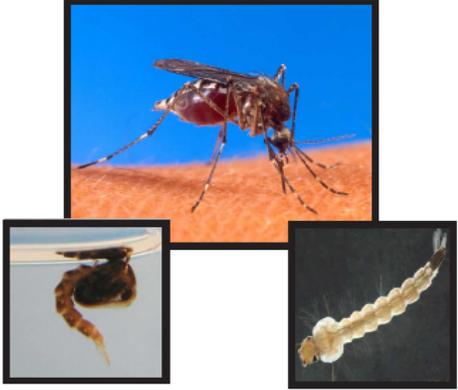
Maryland Department of Natural Resources, Maryland Geological Survey, Atlantic Coastal Plain, Maryland Geology. <http://www.mgs.md.gov/geology/index.html> (accessed 4 Oct. 2021).

- Prince George's & Anne Arundel Counties in Atlantic Coastal Plain (brown blob)
- SE of rocky Fall Zone (red line)
- Natural features:
 - Upland: fairly flat to moderately rolling
 - Lowland: even flatter
 - Anacostia & Patuxent rivers with large floodplains, creeks, streams
- Man-made features:
 - Urban development
 - Suburban development
- Many standing water sites
→ ideal mosquito breeding!

Maryland's Mosquitoes: 11 Genera, 64 (65?) Species

MARYLAND PESTICIDE APPLICATOR
TRAINING MANUAL

PUBLIC HEALTH
MOSQUITO CONTROL



61 (+ **Cs. annulata?*)

+

Ae. dupreei, *Cx. peccator*, *Ps. varipes*

Genus	Number of Species
<i>Aedes</i>	4
<i>Ochlerotatus</i>	23
<i>Coquillettidia</i>	1
<i>Culex</i>	6
<i>Culiseta</i>	5 + 1*
<i>Anopheles</i>	9
<i>Orthopodomyia</i>	2
<i>Psorophora</i>	8
<i>Toxorhynchites</i>	1
<i>Uranotaenia</i>	1
<i>Wyeomyia</i>	1

Arbovector Species Surveilled by Maryland Department of Health

- *Ae. aegypti*
 - *Ae. albopictus*
 - *Ae. vexans*
 - *Oc. japonicus*
 - *Oc. triseriatus*
 - *Oc. trivittatus*
 - *Cq. perturbans*
 - *Cs. melanura*
 - *Cx. pipiens*
 - *Cx. restuans*
 - *Cx. salinarius*
- Morphological Group
- Cx. pipiens/restuans*
- 

Mosquito pools tested for WNV & EEEV (July to Sept./Oct.)

Mosquito Traps Used

- CDC Light



- CDC, RC Gravid



- BG Sentinel, II



- Fay-Prince



Also:

Aspirator
Landing Count
Resting Box

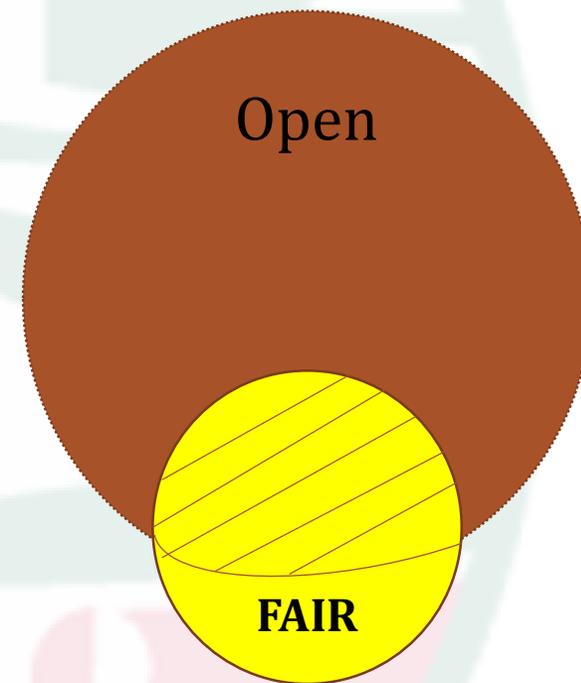
Why Release Abundance Data Publicly?

- Mosquito control & public health officials use current data
 - planning immediate pesticide applications
 - billing/reporting to sprayed communities
- Historical data just as valuable! (Rund et al., 2019a, March, JAMCA, 35(1), 75-83)
- **Population biologists & vector biologists** → species & arbovirus studies
 - population dynamics
 - distributions
 - ranges and elevations
 - phenology
- **Scientists outside public health** → related biological studies
 - climate change
 - land use (i.e.: urbanization, wetlands restoration)
- **Program Managers** → archiving annual datasets establish baselines to plan & protect budgets

Open vs. FAIR Principles of Data Archiving

(<https://www.go-fair.org/fair-principles/>)

- **Findable**
 - online data repository
 - labeled with metadata (keywords, tags)
- **Accessible**
 - through well-defined conditions – not necessarily **open/free***
 - consider user authentication/authorization
 - read-only downloads
- **Interoperable**
 - integrable with other data
 - actionable by software / workflows
- **Reusable**
 - survive software / hardware updates and/or replacements
 - repeatable



*** May not apply to data restricted by privacy / national security / business competition concerns**

Challenges to Archiving Datasets

- **Data sharing**
 - organization's public information policy
 - "clean" private information
- **Dataset:** design before data entry!
 - table format sore enough details?
 - accuracy: (i.e.: exact vs. approximate coordinates)
 - running totals (season)
 - checksums (export)
 - read-only access
 - datasheet with version & format
- **Dataset maintenance:** works in progress!
 - incomplete and/or erroneous tables
 - misfiled / misplaced logs
 - changes in formats (historical, future)
 - → need **version control & user notifications**
- **Labor and hardware costs:**
 - initial data entry, formatting, cleaning
 - dataset maintenance
 - data repository or cloud account
 - staff member(s), intern(s), volunteer(s)
 - dedicated computer & large monitor

Where to Archive Abundance Data?

- Create & manage your own repository:
 - **Mendeley Data** (<https://data.mendeley.com/>)
 - free, managed by Elsevier Inc.
 - cloud storage
 - no data interactivity



Mendeley Data

- **VectorSurv.org**
 - partnership
 - Mosquito and Vector Control Association of California (60+ agencies)
 - California Department of Public Health
 - Davis Arbovirus Research and Training (DART) Lab at University of California, Davis
 - organizations from Utah, New Jersey & Arizona also contribute data



- **VectorBase.org**
 - managed by NIH's NIAID VEuPathDB Bioinformatics Resource Center
 - bimonthly releases, dataset announcements
 - webinars, online help



GIS Viewing

MDA - College Park Field Office's Mosquito Abundance Tables - Highlights

- Annual trapping paper logs => 23 sets
- 1999 through 2020 seasons
 - additional 2016 dataset
- All files - about 3 Mbytes total
 - $19K \leq \text{file size} \leq 328K$
- Primary Sites:
 - Prince George's neighborhoods (varied)
 - Patuxent Wildlife Research Center (PG & AA)
- A few records from neighboring counties:
 - Frederick
 - Howard
 - Montgomery
- Population Abundance
 - over 780K trapped
 - roughly 35K / season
 - 17K (2007) to 80K (2018)
- Traps Deployed
 - over 10K set
 - about 490 traps / season
 - 281 (2001) to 781 (2019)
- Trap Types
 - CDC Light (every year)
 - BG (2006+)
 - Fay-Prince (2001 - 2007)
 - Gravid (2000, 2005, 2020+)

MDA - College Park Field Office's Mosquito Abundance Tables – Quick Summary

Year	Abundance	No. of Traps	Trap Type(s)	Size
1999	27,999	304	CDC Light	81K
2000*	44,378	399	CDC Light, Gravid	99K
2001*	36,397	281	CDC Light, Fay-Prince	78K
2002	30,395	370	CDC Light, Fay-Prince	93K
2003*	33,252	390	CDC Light, Fay-Prince	101K
2004	29,476	512	CDC Light, Fay-Prince	122K
2005	29,730	368	CDC Light, Fay-Prince, Gravid	98K
2006	39,382	509	CDC Light, BG, Fay-Prince	129K
2007	17,009	456	CDC Light, BG, Fay-Prince	111K
2008	27,951	452	CDC Light, BG	114K
2009*	28,600	486	CDC Light, BG	124K
2010	23,373	476	CDC Light, BG	118K

Year	Abundance	No. of Traps	Trap Type(s)	Size
2011	35,522	518	CDC Light, BG	130K
2012	41,643	477	CDC Light, BG	119K
2013	23,254	479	CDC Light, BG	119K
2014	18,903	531	CDC Light, BG	136K
2015	33,920	471	CDC Light, BG	129K
2016	25,467	560	CDC Light, BG	142K
2016, supplement	249	14	BG	19K
2017	42,640	623	CDC Light, BG	328K
2018	80,067	589	CDC Light, BG	168K
2019	55,035	781	CDC Light, BG	197K
2020	34,646	596	CDC Light, BG, Gravid	150K
2021**	49,308	629	CDC Light, BG, Gravid	200K

MDA - College Park Field Office's Mosquito Abundance Tables - Location

- Archived at **VectorBase.org**
- **VEuPathDB.org**: suite of online bioinformatics resources
- Excel spreadsheet in **Minimum Information for Reporting Arthropod Abundance Data** format (Rund, S. et al., 2019b, Apr., Scientific Data, 6(40))
- VectorBase **MapVEu** tool:
 - view counts on ArcGIS map
 - search parameters
 - download part/all (.csv)



MIReAD Table Header (Each Dataset)

1. Point of Contact's details
2. File description → "2020 adult mosquito abundances for PG, AA counties, Maryland, USA, version 1.0"
3. File's publication citation (if any) → "unpublished"
4. Species ID method used → morphological (vs. molecular diagnostics)
5. "Not present" vs. "Zero" clarification
6. Location / GPS details (neighborhood participation, coordinate source, etc.)
7. Data usage information (i.e.: restrictions) → "N/A"
8. Additional notes (reference articles, intersex specimens, etc.)

MDA Dataset Table Columns (MIReAD)

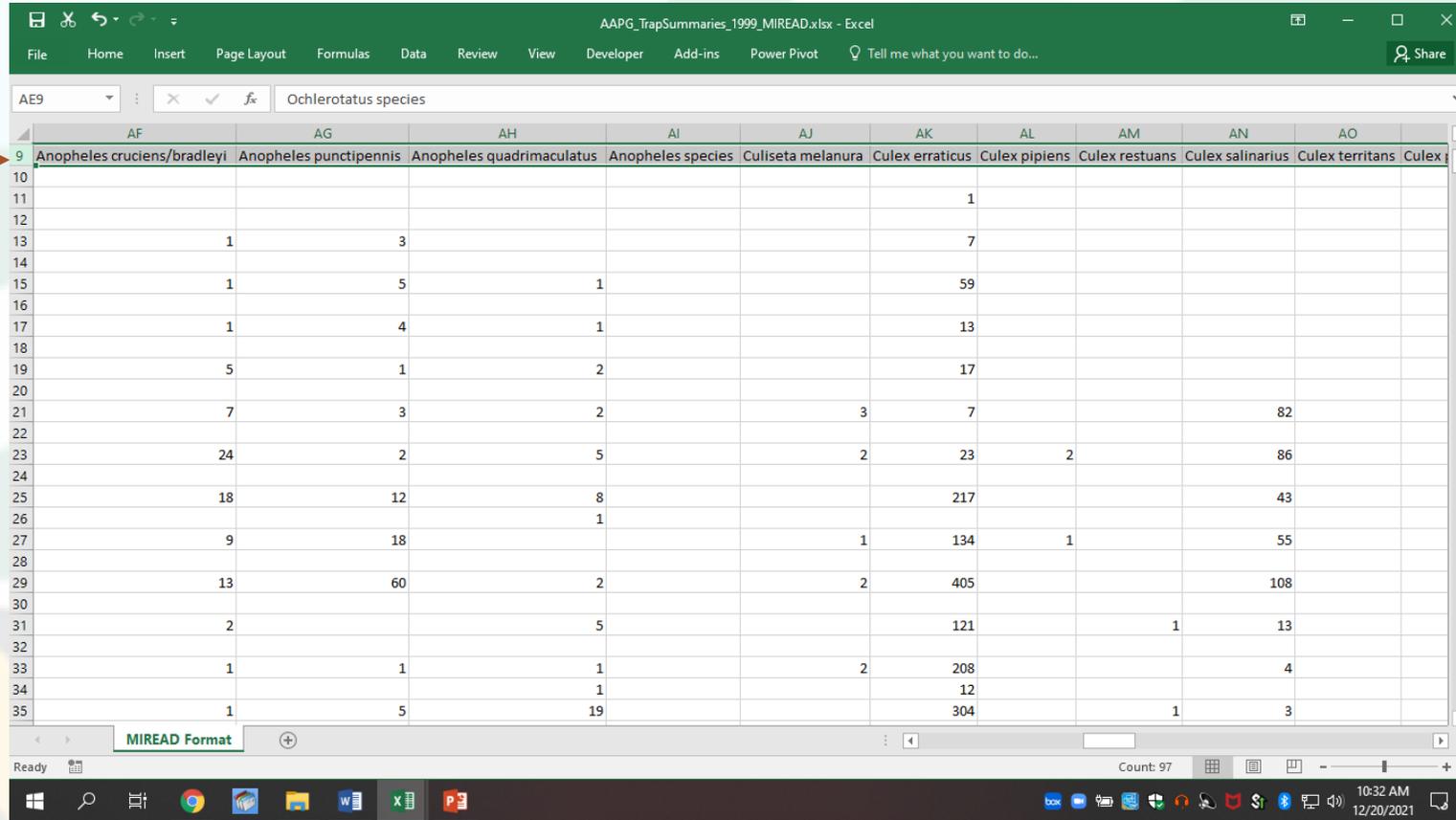
- Dates trap deployed, retrieved
- Trap type, lures
- Trap malfunction (Yes / No)
- Location:
 - County
 - Town
 - Neighborhood
 - Site / Street Name
 - Latitude (approximate)
 - Longitude (approximate)
- **“Unknown” entered for missing date and/or location**
- **House numbers removed for privacy**
- Life Stage (all “Adult”)
- Sex (Male / Female / Intersex / Unknown)
- Count categories
 - Species
 - Morphological group
 - Genus
 - Unidentified
- Abundance total for trap event
- Mosquito pool positives
 - **West Nile Virus (WNV)**
 - Eastern Equine Encephalitis Virus (EEEV)
 - Chikungunya Virus (CHIKV)
 - Dirofilaria immitis (heartworm)
 - **Cache Valley Virus (CVV)**

Sample MDA MIREAD File

Header Rows

Trap Set Year	Trap Set Month	Trap Set Day	Trap Collector	Trap Collector	Trap Collector	Trap Method	Trap Attractant	Trap Malfunction	MDA CDC ID Number	Maryland County	Town	Neighborhood	Site
1999	6	28	1999	6	29	CDC LIGHT TRAP	LIGHT, CO2	No		Anne Arundel	Laurel	Patuxent Wildlife Refuge Cer N1	
1999	6	28	1999	6	29	CDC LIGHT TRAP	LIGHT, CO2	No		Anne Arundel	Laurel	Patuxent Wildlife Refuge Cer N1	

Sample MDA MIREAD File (Abundance Data)



The screenshot displays an Excel spreadsheet titled "AAPG_TrapSummaries_1999_MIREAD.xlsx". The spreadsheet is in "MIREAD Format" and shows abundance data for various species across different samples. The header row (row 9) lists species names under columns AF through AO. The data rows (10-35) show numerical abundance values for each species across various samples.

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	
9	Anopheles cruciens/bradleyi	Anopheles punctipennis	Anopheles quadrimaculatus	Anopheles species	Culiseta melanura	Culex erraticus	Culex pipiens	Culex restuans	Culex salinarius	Culex territans	Culex
10											
11						1					
12											
13		1	3			7					
14											
15		1	5	1		59					
16											
17		1	4	1		13					
18											
19		5	1	2		17					
20											
21		7	3	2		3	7			82	
22											
23		24	2	5		2	23	2		86	
24											
25		18	12	8		217				43	
26				1							
27		9	18			1	134	1		55	
28											
29		13	60	2		2	405			108	
30											
31		2		5			121	1		13	
32											
33		1	1	1		2	208			4	
34				1			12				
35		1	5	19			304	1		3	

Sample MDA MIREAD File (Trap Totals)

The screenshot shows an Excel spreadsheet titled "AAPG_TrapSummaries_1999_MIREAD.xlsx". The spreadsheet contains data for trap sets in 1999. The columns are: Trap Set Year, Trap Set Month, Trap Set Day, Wyeomyia smithii, Trap Total, West Nile Virus, Eastern Equine Encephalitis, Chikungunya Virus, Dirofilaria immitis, and Cache Valley Virus. The data rows are numbered 596 to 621. Two brown arrows point to the 'Trap Total' values for rows 605 and 617.

Trap Set Year	Trap Set Month	Trap Set Day	Wyeomyia smithii	Trap Total	West Nile Virus	Eastern Equine Encephalitis	Chikungunya Virus	Dirofilaria immitis	Cache Valley Virus
596	1999	6	8	1					
597	1999	6	8	134					
598	1999	8	26	0					
599	1999	8	26	16					
600	1999	10	20	0					
601	1999	10	20	0					
602	1999	6	8	1					
603	1999	6	8	65					
604	1999	8	26	7					
605	1999	8	26	24					
606	1999	10	20	0					
607	1999	10	20	0					
608	1999	6	24	1					
609	1999	6	24	205					
610	1999	6	24	0					
611	1999	6	24	3					
612	1999	10	20	0					
613	1999	10	20	2					
614	1999	7	20	0					
615	1999	7	20	0					
616	1999	7	20	0					
617	1999	7	20	9					
618				27999					
619				1170					
620				26829					
621				27999					

Sample MDA MIREAD File (Species Sums)

AAPG_TrapSummaries_1999_MIREAD.xlsx - Excel

	A	B	C	Q	R	S	T	U	V	W	X
9	Trap Set Year	Trap Set Month	Trap Set Day	Life Stage	Mosquito Sex	Aedes albopictus	Aedes vexans	Aedes species	Ochlerotatus atlanticus	Ochlerotatus canadensis	Ochlerotatus cantans
596	1999	6	8	Adult	Male						
597	1999	6	8	Adult	Female		3	1			
598	1999	8	26	Adult	Male						
599	1999	8	26	Adult	Female						
600	1999	10	20	Adult	Male						
601	1999	10	20	Adult	Female						
602	1999	6	8	Adult	Male						
603	1999	6	8	Adult	Female		9				
604	1999	8	26	Adult	Male						
605	1999	8	26	Adult	Female						
606	1999	10	20	Adult	Male						
607	1999	10	20	Adult	Female						
608	1999	6	24	Adult	Male						
609	1999	6	24	Adult	Female		10				
610	1999	6	24	Adult	Male						
611	1999	6	24	Adult	Female						
612	1999	10	20	Adult	Male						
613	1999	10	20	Adult	Female						
614	1999	7	20	Adult	Male						
615	1999	7	20	Adult	Female						
616	1999	7	20	Adult	Male						
617	1999	7	20	Adult	Female						
618				Column Total:		136	1259	135	0		147
619				Males Total:		14	24	65	0		6
620				Females Total:		122	1235	70	0		141
621				M + F Total:		136	1259	135	0		147

MIREAD Format

Ready | Average: -12.57354 | Count: 18 | Sum: -37.72062 | 10:23 AM 10/18/2021

Accessing Datasets – VectorBase.org

The screenshot displays the VectorBase.org website interface. At the top, the navigation bar includes the VectorBase logo, a search bar with the placeholder text "Site search, e.g. AGAP004730 or *reductase or *binding protein", and a user profile icon labeled "Guest". The main navigation menu contains links for "My Strategies", "Searches", "Tools", "My Workspace", "Data", "About", "Help", and "Contact Us". A dropdown menu is open under the "Data" tab, listing the following options: "Analysis methods", "Data sets in VectorBase", "Data sets we are working on", "Download data files", "Organisms: Genome Info & Stats", and "User uploaded files".

On the left side, there is a "Search for..." section with a filter dropdown and a list of categories: Genes, Organisms, Genomic Sequences, Genomic Segments, ESTs, and Metabolic Pathways. The main content area features an "Overview of Resources and Tools" section with icons for "Take a Tour", "Getting Started", "Search Strategies", and "Genome Browser". Below this is a "Getting Started" section with introductory text and a "SITE SEARCH" prompt.

The footer includes the BRC (NIH/NIID Bioinformatics Resource Centers) logo, a row of icons representing various biological databases, the copyright notice "©2021 The VEuPathDB Project Team", and a "COMMUNITY CHAT" button. The browser's address bar shows the URL "https://vectorbase.org/vectorbase/app/#" and the system tray at the bottom right indicates the time "12:49 PM" and date "12/9/2021".

Accessing Datasets – Search Window

The screenshot shows the VectorBase search interface. The browser address bar displays the URL: `vectorbase.org/vectorbase/app/search/dataset/AllDatasets/result?filterTerm=Maryland%20Department%20of%20Agriculture`. The page header includes the VectorBase logo, a search bar with the placeholder text "Site search, e.g. AGAP004730 or *reductase or *binding protein", and navigation links for "My Strategies", "Searches", "Tools", "My Workspace", "Data", "About", "Help", and "Contact Us". A "My Organism Preferences (54 of 54) disabled" button is also visible.

The main content area is titled "Data Sets" and features a dropdown menu set to "Maryland Department of Agriculture". Below the dropdown, it indicates "Showing 1 - 23 of 1209 Data Sets". There are buttons for "Download" and "Add / Remove Columns".

Data Set	Organism(s) (source or reference)	Data Set Version	Release # and Date	Category	References	Summary
Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 1999		2021-05-03	VectorBase rel. 47, 2020-APR-07	Population Biology		Maryland Dept. of Agriculture \ (MapVEu VBP0000745)
Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2000		2021-05-03	VectorBase rel. 47, 2020-APR-07	Population Biology		Maryland Dept. of Agriculture \ (MapVEu VBP0000746)
Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2001		2021-05-03	VectorBase rel. 47, 2020-APR-07	Population Biology		Maryland Dept. of Agriculture \ (MapVEu VBP0000747)
Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2002		2021-05-03	VectorBase rel. 47, 2020-APR-07	Population Biology		Maryland Dept. of Agriculture \ (MapVEu VBP0000748)
Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2003		2021-06-16	VectorBase rel. 47, 2020-APR-07	Population Biology		

A "COMMUNITY CHAT" button is located at the bottom right of the table area.

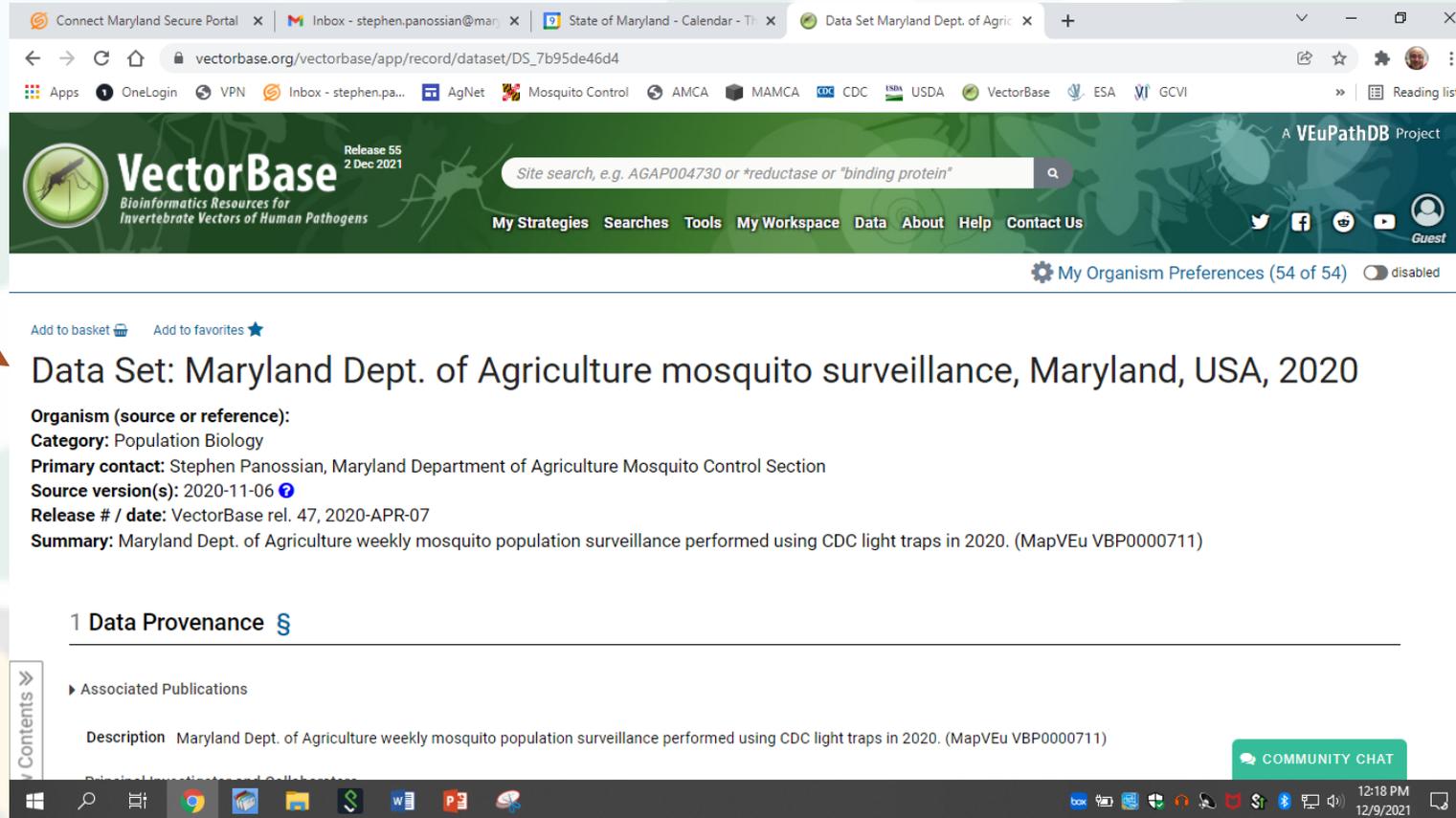
Accessing Datasets – Select Dataset from List

The screenshot shows the VectorBase website interface. The browser address bar displays the URL: `vectorbase.org/vectorbase/app/search/dataset/AllDatasets/result?filterTerm=Maryland%20Department%20of%20Agriculture`. The page header includes the VectorBase logo, a search bar, and navigation links: My Strategies, Searches, Tools, My Workspace, Data, About, Help, Contact Us. A 'My Organism Preferences (54 of 54) disabled' toggle is visible.

Data Set	Organism(s) (source or reference)	Data Set Version	Release # and Date	Category	References	Summary
Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2015		2021-05-03	VectorBase rel. 47, 2020-APR-07	Population Biology		Maryland Dept. of Agriculture \ traps in 2015. (MapVEu VBP0000761)
Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2016		2020-05-15	VectorBase rel. 47, 2020-APR-07	Population Biology		Maryland Dept. of Agriculture \ traps in 2016. (MapVEu VBP0000761)
Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2017		2020-05-15	VectorBase rel. 47, 2020-APR-07	Population Biology		Maryland Dept. of Agriculture \ traps in 2017. (MapVEu VBP0000761)
Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2018		2019-07-31	VectorBase rel. 47, 2020-APR-07	Population Biology		Maryland Dept. of Agriculture \ traps in 2018. (MapVEu VBP0000526)
Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2019		2020-05-16	VectorBase rel. 47, 2020-APR-07	Population Biology		Maryland Dept. of Agriculture \ traps in 2019. (MapVEu VBP0000761)
Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2020		2020-11-06	VectorBase rel. 47, 2020-APR-07	Population Biology		Maryland Dept. of Agriculture \ traps in 2020. (MapVEu VBP0000711)
Supplemental Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2016		2020-05-21	VectorBase rel. 47, 2020-APR-07	Population Biology		Supplemental Maryland Dept. \ light traps and BG traps in 2016. (MapVEu VBP0000761)

The footer contains the following text: "The VEuPathDB Bioinformatics Resource Center makes genomic, phenotypic, and population-centric data accessible to the scientific community. VectorBase provides support for... This project is funded in part by the US National Institute of Allergy and Infectious Diseases (Contract HHSN75N93019C00077), with additional support from the Wellcome Trust (Resource... COMMUNITY CHAT".

Accessing Datasets – Results



Connect Maryland Secure Portal | Inbox - stephen.panossian@mar... | State of Maryland - Calendar - T... | Data Set Maryland Dept. of Agric...

vectorbase.org/vectorbase/app/record/dataset/DS_7b95de46d4

Apps | OneLogin | VPN | Inbox - stephen.pa... | AgNet | Mosquito Control | AMCA | MAMCA | CDC | USDA | VectorBase | ESA | GCVI | Reading list

VectorBase Release 55 2 Dec 2021
Bioinformatics Resources for Invertebrate Vectors of Human Pathogens

Site search, e.g. AGAP004730 or *reductase or "binding protein"

My Strategies | Searches | Tools | My Workspace | Data | About | Help | Contact Us

My Organism Preferences (54 of 54) disabled

Add to basket | Add to favorites

Data Set: Maryland Dept. of Agriculture mosquito surveillance, Maryland, USA, 2020

Organism (source or reference):
Category: Population Biology
Primary contact: Stephen Panossian, Maryland Department of Agriculture Mosquito Control Section
Source version(s): 2020-11-06
Release # / date: VectorBase rel. 47, 2020-APR-07
Summary: Maryland Dept. of Agriculture weekly mosquito population surveillance performed using CDC light traps in 2020. (MapVEU VBP0000711)

1 Data Provenance §

Associated Publications

Description Maryland Dept. of Agriculture weekly mosquito population surveillance performed using CDC light traps in 2020. (MapVEU VBP0000711)

COMMUNITY CHAT

12:18 PM 12/9/2021

Accessing Datasets – Results

Connect Maryland Secure Portal | Inbox - stephen.panossian@mar... | 2022 Annual Conference | Virgin... | Data Set Maryland Dept. of Agric...

vectorbase.org/vectorbase/app/record/dataset/DS_24b5e4739f

Apps | OneLogin | VPN | Inbox - stephen.pa... | AgNet | Mosquito Control | AMCA | MAMCA | CDC | USDA | VectorBase | ESA | GCVI

VectorBase
Bioinformatics Resource for Invertebrate Vectors of Human Pathogens

Site search, e.g. AGAP004730 or *reductase or "binding protein"

My Strategies Searches Tools My Workspace Data About Help Contact Us

My Organism Preferences (54 of 54) disabled

Source version(s): 2021-05-03 ⓘ
Release # / date: VectorBase rel. 47, 2020-APR-07
Summary: Maryland Dept. of Agriculture weekly mosquito population surveillance performed using various traps in 2000. (MapVEu VBP0000746)

1 Data Provenance

Show Contents ▾

- ▶ Associated Publications
 - Description Maryland Dept. of Agriculture weekly mosquito population surveillance performed using various traps in 2000. (MapVEu VBP0000746)
- ▶ Principal Investigator and Collaborators
- ▶ Data Set Release History

2 Link outs

- ▶ Explore this Data Set within this Website
 - View this Data Set in MapVEu

COMMUNITY CHAT

8:09 AM
12/16/2021

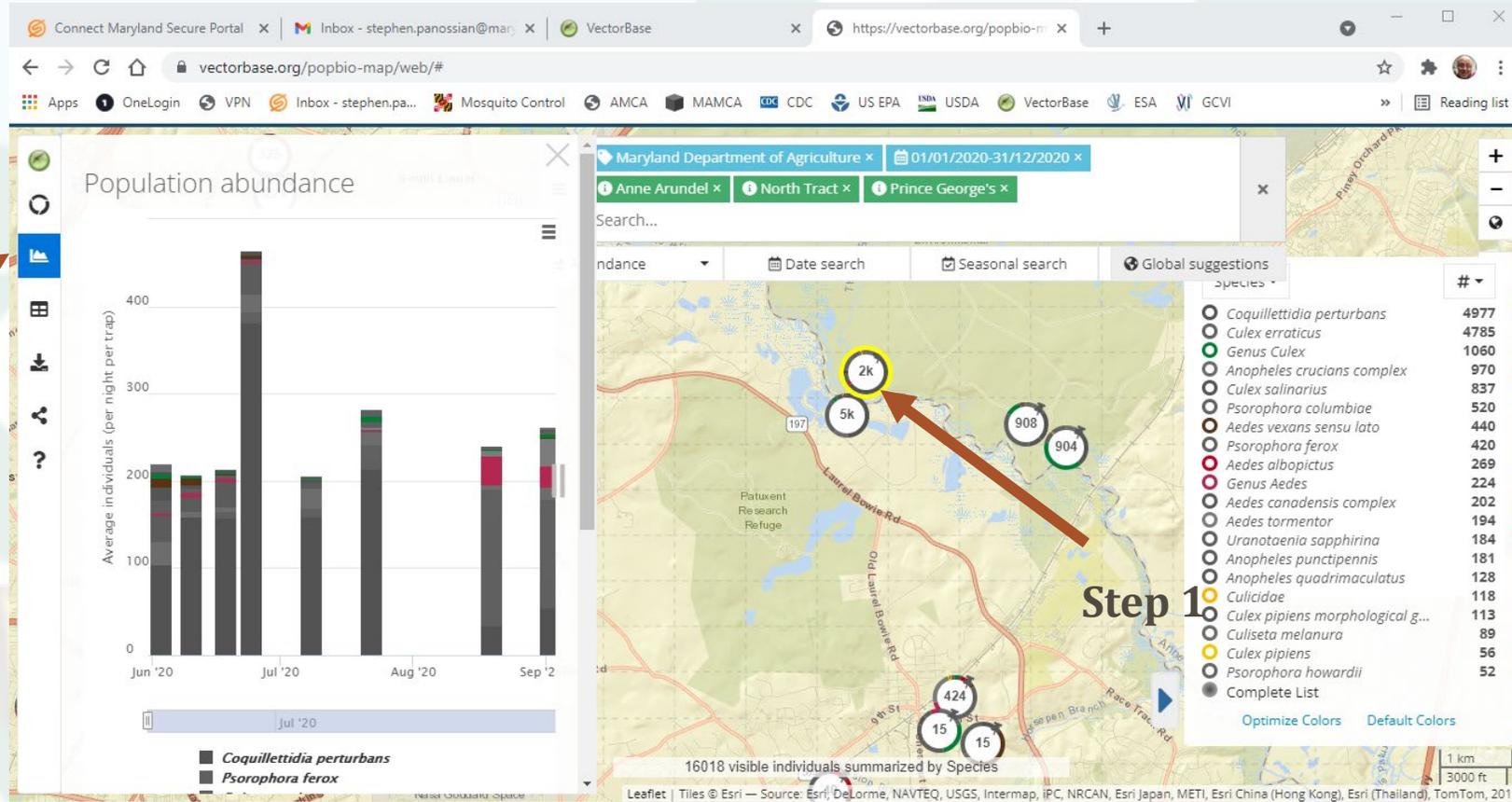
Accessing Datasets – MapVEu

The screenshot displays the MapVEu web application interface. The browser address bar shows the URL: `vectorbase.org/popbio-map/web/?projectID=VBP0000711#`. The application is titled "VBP0000711" and "Abundance". A search bar is visible with the text "Search...". Below the search bar, there are tabs for "Abundance", "Date search", "Seasonal search", and "Global suggestions". A dropdown menu is open, showing options: "Samples", "Insecticide Resistance", "Genotypes", "Abundance" (highlighted), "Pathogen", and "Blood Meal". On the right side, a "Species" list is displayed with a column for "#". The list includes various species and their counts, such as *Culex erraticus* (9182), *Coquillettidia perturbans* (5820), and *Genus Culex* (3260). A red circle highlights the number "34k" next to "Philadelphia" on the map. At the bottom, a status bar indicates "33518 visible individuals summarized by Species: Hide zeros". The system tray at the bottom shows the time as 3:33 PM on 12/9/2021.

Species	#
<i>Culex erraticus</i>	9182
<i>Coquillettidia perturbans</i>	5820
Genus <i>Culex</i>	3260
<i>Culex salinarius</i>	2219
<i>Aedes vexans sensu lato</i>	1877
<i>Aedes albopictus</i>	1779
<i>Psorophora ferox</i>	1194
<i>Anopheles crucians complex</i>	1176
<i>Culex pipiens morphological g...</i>	1063
<i>Psorophora columbiana</i>	768
<i>Culex pipiens</i>	719
Genus <i>Aedes</i>	648
<i>Anopheles punctipennis</i>	608
<i>Aedes tormentor</i>	434
<i>Culicidae</i>	399
<i>Anopheles quadrimaculatus</i>	386
<i>Aedes canadensis complex</i>	334
<i>Uranotaenia sapphirina</i>	327
<i>Culex restuans</i>	308
<i>Aedes triseriatus</i>	200
Complete List	

Population Abundance Graph

Step 2



Step 1

Downloading a Specific Dataset

The screenshot shows the VectorBase web application interface. The browser address bar displays `vectorbase.org/popbio-map/web/#`. The page title is "Export data".

Step 1: An arrow points to the "Download a CSV file containing" dropdown menu, which is currently set to "data visible on screen".

Step 2: An arrow points to the "with the following fields" dropdown menu, which is currently set to "20 fields selected".

Step 3: An arrow points to the blue "Download" button.

The main map area shows a map of the Annapolis region with several circular markers indicating specimen collection sites. A tooltip for one site shows "143 specimens collected". A legend on the right side of the map lists various mosquito species and their counts:

Species	Count
<i>Culex erraticus</i>	3895
<i>Coquillettidia perturbans</i>	3142
Genus <i>Culex</i>	2107
<i>Aedes vexans sensu lato</i>	1563
<i>Aedes albopictus</i>	1497
<i>Culex salinarius</i>	1426
<i>Culex pipiens morphological g...</i>	901
<i>Psorophora ferox</i>	859
<i>Anopheles crucians complex</i>	688
<i>Culex pipiens</i>	662
<i>Psorophora columbiana</i>	636
Genus <i>Aedes</i>	430
<i>Anopheles punctipennis</i>	423
<i>Aedes tormentor</i>	360
<i>Culicidae</i>	280
<i>Culex restuans</i>	250
<i>Uranotaenia sapphirina</i>	243
<i>Anopheles quadrimaculatus</i>	239
<i>Aedes canadensis complex</i>	149
<i>Aedes triseriatus</i>	143
Complete List	

At the bottom of the map, it says "20426 visible individuals summarized by Species".

Future Work

- Abundance data & VectorBase
 - submissions: 2021
 - revisions: 2000, 2001, 2003, 2009
 - continued annual releases
 - continued revisions (2006)
- Digitizing historical data
 - pool records (1999+)
 - abundance data from other Maryland counties (1957+)
- Develop Visual Basic interface for Excel data entry

MDA Mosquito Control Trapping Data Entry Form v0.0

Trapping Data | Abundance Data

Set Date: YYYY MM DD Retrieved Date: YYYY MM DD Maryland County: Neighborhood/Location: City/Town: Street Address/Zip: Latitude: North/South Longitude: West/East Elevation (ft):

Life Stage: Adult, Larva - 4th Instar, Larva - 3rd Instar, Larva - 2nd Instar, Larva - 1st Instar Gender: Female, Male, Unidentified, Intrapex Abundance Count: Trap Total: Abundance Positive: Pool Count: MDA CDC ID Number (optional):

Dataset Record(s): Edit Back Smart Save Quit

Alpha Version

Dataset Article to be Published?

- **Manuscript submissions (free!)**
 - *Proceedings of the Entomological Society of Washington*
 - *American Entomologist*, “Field and Bench” column
- Publishing dataset announcements **almost as expensive** as publishing research papers in journals!

Summary

- Historical abundance data useful to users outside mosquito control
- MDA CPFO: 23 annual datasets, 1999 through 2020
- Display & download from VectorBase.org
- Consider releasing your own arbovector data!

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Questions?

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Thank You for Your Attention!

P.S. Get your COVID-19 vaccine and booster shots!

